

# A CORRECTION TO A HIGHLY ACCURATE VOIGT FUNCTION ALGORITHM

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An algorithm for rapidly computing the complex Voigt function was published by Shippony and Read [1]. Its claimed accuracy was 1 part in  $10^8$ . It was brought to our attention by Wells [2] that Shippony and Read [1] was not meeting its claimed accuracy for extremely small but non zero  $y$  values. Although true, the fix to the code is so trivial to warrant this note for those who use this algorithm. In the code, there exist in two subroutines, `VoigtR1` and `VoigtR3` a threshold variable called `tiny` = 1.0d-12. Any value of  $10^{-12} > y > 0$  may have errors exceeding the target accuracy. The parameterization for `tiny` should have been the minimum precision of the computer (it is machine dependent, for the SGI origin it is `tiny` = 2.2d-16). Fortunately, FORTRAN 90 has a function, `epsilon(y)` that returns the smallest allowable value therefore setting `tiny` = `epsilon(y)` will ensure the algorithm's accuracy on any platform. We thank R. J. Wells for bringing this error to our attention.

## References

- [1] Z. Shippony and W. G. Read. A highly accurate Voigt function algorithm. *J. Quant. Spectrosc. Radiat. Transfer*, 50:635–646, 1993.
- [2] R. J. Wells. Rapid approximation to the Voigt/Faddeeva function and its derivatives. *J. Quant. Spectrosc. Radiat. Transfer*, 62(1):29–48, 1999.